

WHAT IS CLAIMED IS:

1                   1.       A device for percutaneously exposing an outer layer of a body lumen  
2 or body cavity of a patient which is covered by an inner layer comprising:  
3                   a catheter body having a proximal end, a distal end and a lumen therethrough;  
4 and  
5                   a dissection tool disposed near the distal end of the catheter body adapted to  
6 expose a portion of the outer layer.

1                   2.       A device as in claim 1, wherein the body lumen comprises a blood  
2 vessel, the inner layer comprises an intimal layer, and the outer layer comprises an adventitial  
3 layer.

1                   3.       A device as in claim 2, wherein the dissection tool comprises a radially  
2 expansive element configured to contact the vessel wall in an expanded position.

1                   4.       A device as in claim 3, wherein the radially expansive element  
2 comprises a cutting surface configured to cut through the intimal layer of the vessel wall to  
3 expose a portion of the adventitial layer after contact with the vessel wall in the expanded  
4 position.

1                   5.       A device as in claim 4, wherein the cutting surface is configured to cut  
2 by rotation of the radially expansive element.

1                   6.       A device as in claim 3, wherein the radially expansive element  
2 comprises an abrasive surface configured to abrade an intimal layer of the vessel wall to  
3 expose a portion of the adventitial layer after contact with the vessel wall in the expanded  
4 position.

1                   7.       A device as in claim 6, wherein the abrasive surface is configured to  
2 abrade by rotation of the radially expansive element.

1                   8.       A device as in claim 3, wherein the radially expansive element is  
2 advanceable along the exposed portion of the adventitial layer to delaminate the intimal layer  
3 from the adventitial layer along a segment of the blood vessel.



3 adhesive surface adapted to adhere to an intimal layer of the vessel wall upon contact with the  
4 vessel wall.

1 20. A device as in claim 19, wherein the adhesive element is capable of  
2 removing the adhered portions of the intimal layer from the vessel wall to expose portions of  
3 the adventitial layer upon withdrawal of the adhesive element.

1 21. A device as in claim 19, wherein the adhesive surface comprises a  
2 vacuum suction.

1 22. A device as in claim 20, wherein the adhesive surface comprises  
2 cyanoacrylate, UV curable adhesive, epoxy, bioadhesives, and collagen based adhesives.

1 23. A device as in claim 19, wherein the adhesive surface comprises a  
2 material having a temperature in the range of approximately -100°C to 0°C.

1 24. A device as in claim 19, wherein the adhesive surface comprises a  
2 material having a temperature in the range of approximately 42°C to 100°C.

1 25. A device as in claim 2, further comprising a stripping tool adapted to  
2 be received within the catheter body lumen, said stripping tool comprising a stripping  
3 component configured to contact the exposed portion of the adventitial layer and advance  
4 along the exposed portion to delaminate the intimal layer from the adventitial layer along a  
5 segment of the blood vessel.

1 26. A device as in claim 25, wherein the stripping tool further comprises a  
2 shaft having a proximal end, a distal end and a threaded surface along at least a portion of its  
3 length, wherein the stripping component is mounted on the shaft so that rotation of the shaft  
4 advances the stripping component along the shaft.

1 27. A device as in claim 26, wherein the stripping component is mounted  
2 on the shaft so that rotation of the shaft linearly advances the stripping component along the  
3 shaft without rotating the stripping component.

1 28. A device as in claim 25, wherein the stripping component comprises a  
2 radially expansible ring positionable between the intimal and adventitial layers so that the  
3 intimal layer passes through the inside of the ring during advancement.



1 39. A device as in claim 25, wherein the stripping component comprises an  
2 inflatable member.

1 40. A device as in claim 39, wherein the stripping component further  
2 comprises an angioscope disposed within the inflatable member for visualization of the  
3 delamination process.

1 41. A device as in claim 39, wherein the stripping tool further comprises  
2 an anchoring component configured to contact the vessel wall near the exposed portion of the  
3 adventitial layer and remain fixed in place during advancement of the stripping component.

1 42. A device as in claim 41, wherein the anchoring component comprises  
2 an inflatable member configured to overexpand the blood vessel.

1 43. A device as in claim 25, wherein the stripping tool further comprises:  
2 a shaft having a proximal end and a distal end, wherein the stripping  
3 component is disposed therebetween;  
4 a proximal occlusion member mounted on the shaft proximal to the stripping  
5 component;  
6 a distal occlusion member mounted on the shaft distal to the stripping  
7 component; and  
8 an angioscope and light source disposed between the occlusion members,  
9 wherein the occlusion members are capable of isolating a section of the vessel  
10 that is fillable with saline for visualization of the delamination by the angioscope during  
11 advancement of the stripping component.

1 44. A device as in claim 2, further comprising a stripping tool adapted to  
2 be received within the catheter body lumen, said stripping tool comprising a stripping  
3 component configured to be inserted between the intimal and adventitial layers and to be  
4 rotated around a longitudinal axis of the catheter body to delaminate the intimal layer from  
5 the adventitial layer along a segment of the blood vessel.

1 45. A device as in claim 2, wherein the dissection tool is configured to  
2 advance along the exposed portion to delaminate the intimal layer from the adventitial layer  
3 along a segment of the blood vessel.

1                   46.     A device as in claim 2, further comprising a cutting tool adapted to be  
2     received within the catheter body lumen, said cutting tool comprising a ring configured to be  
3     advanceable along a cleavage plane between a delaminated intimal layer and the adventitial  
4     layer.

1                   47.     A device as in claim 46, wherein the ring comprises a support tube and  
2     a cutting wire, wherein the support tube is retractable to expose the cutting wire which is  
3     configured to cut through the delaminated intimal layer when tensioned.

1                   48.     A device for percutaneously exposing an outer layer of a body lumen  
2     or body cavity of a patient which is covered by an inner layer comprising:  
3                   a catheter body having a proximal end, a distal end, and a lumen therethrough;  
4     and  
5                   a dissection means disposed near the distal end of the catheter body for  
6     exposing a portion of the outer layer.

1                   49.     A device as in claim 48, further comprising a stripping means adapted  
2     to be received within the catheter body lumen for delaminating the inner layer from the outer  
3     layer.

1                   50.     A device as in claim 49, further comprising a cutting means adapted to  
2     be received within the catheter body for cutting through and releasing the delaminated inner  
3     layer.

1                   51.     A device for percutaneously delaminating an inner layer of a body  
2     lumen of a patient from an outer layer comprising:  
3                   a catheter body having a proximal end, a distal end, and a lumen therethrough;  
4     and  
5                   means mounted on the catheter body for elongating a segment of the body  
6     lumen to cause delamination of the inner layer from the outer layer.

1                   52.     A device as in claim 51, wherein the means for elongating comprises a  
2     proximal occlusion member and a distal occlusion member which are capable of moving  
3     apart thereby elongating the segment.











1                   84.     A method as in claim 75, wherein the stripping component comprises  
2     an inflatable member having an angioscope disposed within, and the method further  
3     comprises inflating the member within the blood vessel and visualizing with the angioscope  
4     the advancing step of the member along the exposed portion of the adventitial layer.

1                   85.     A method as in claim 84, wherein the stripping tool further comprises  
2     an anchoring component, and the method further comprises anchoring the component within  
3     the blood vessel so that it remains in place during advancement of the stripping component.

1                   86.     A method as in claim 75, further comprising:  
2                   occluding the blood vessel proximal to the stripping component with a  
3     proximal occlusion member;  
4                   occluding the blood vessel distal to the stripping component with a distal  
5     occlusion member;  
6                   providing a visualization means within the blood vessel between the occlusion  
7     members so that the advancement step is visualized by the visualization means.

1                   87.     A method as in claim 86, further comprising filling the vessel between  
2     the occlusion members with saline.

1                   88.     A kit for percutaneously treating an occlusion in the vessel of a patient  
2     comprising:  
3                   a percutaneous catheter having a proximal end, a distal end, a lumen  
4     therethrough and a dissection tool disposed near the distal end adapted to expose a portion of  
5     the adventitial layer; and  
6                   instructions for use including the following methods:  
7                   introducing the catheter into the vessel and advancing the dissection tool to the  
8     site of the occlusion to be treated; and  
9                   contacting the vessel wall with the dissection tool to expose a portion of an  
10    adventitial layer.

1                   89.     A kit as in claim 88, further comprising a percutaneous stripping tool  
2     and said instructions for use further including advancing the stripping tool along the exposed  
3     portion of the adventitial layer to delaminate an intimal layer from the adventitial layer along  
4     a segment of the blood vessel.

